

ABSTRACT

A method for caching specified data in an n-way set associative memory with a copy-back update policy consists of the following steps. First, a row of the associative memory, organized as a plurality of rows and having n ways per row, is selected according to the main memory address of the specified data. The main memory provides primary storage for the data being cached. If one of the ways of the selected row holds invalid data, the specified data is cached in the way holding the invalid data and the data caching process is discontinued. If all n ways of the selected row hold valid data, the following steps are performed. First, a replacement strategy is used to select a way from the selected row. If the way selected in accordance with the replacement strategy holds unmodified data, the specified data is cached in the way selected by the replacement strategy and the data caching process is discontinued. However, if the way selected by the replacement strategy holds modified data, the ways of the selected row are examined again to find a way that holds data from the currently open page of the main memory. If such at least one such way is found, the specified data is cached in one of the ways holding data from the open page, and the data caching process is discontinued. Finally, if none of the ways in the selected row meet the above criteria, the specified data is cached in the way previously selected by the replacement algorithm, and the method terminates.